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Volume XVII SATURDAY, APRIL 14, 1923 Number 433

CURRENT ASPECTS OF THE DOCTRINE OF ORGANIC EVOLUTION[1]

LADIES and gentlemen, members of the Science Section of the Missouri State Teachers' Association: It was with pleasure that I accepted the invitation of your chairman to address you upon the subject of Evolution. As a zoologist, I am vitally interested in the wider understanding of this important generalization of the biological sciences. As a teacher, I welcome the opportunity to set before you its current aspects. As a citizen, I accept the responsibilities of technical knowledge in a situation that typifies the age-long struggle for freedom of thought and teaching.

Definitions are wearisome. But we may ask ourselves, by way of limitation, what is *evolution* in general and *organic evolution* in particular. The answer can best be given by means of illustrations. The term evolution, as to-day used in science, means *the historical process of change.* When we speak of the evolution of man-made products like automobiles and steam-engines, of social institutions like democratic government, of the crust of our earth, of solar systems, of animals and plants, we mean *a gradual coming into existence* of what is now before us, in contrast to its sudden and miraculous creation. Such an idea is of recent origin. Our intellectual forbears of a few centuries ago thought in terms of a world created in its present form. The evolutionary point of view marks an advance from the concept of a static universe to one that is dynamic. In the phraseology of the street, the world is *a going concern*, historically as well as in its present aspects.

Evolution is, therefore, *the doctrine of how things have changed in the past and how they are changing in the present.* It may be naturally divided into its *Cosmic*, *Geologic* and *Organic* aspects, as represented by the sciences of Astronomy, Geology, and Biology.

COSMIC EVOLUTION

Cosmic Evolution really includes all other forms, for by the cosmos we mean the entire visible universe, our very bodies as well as the farthest star. But in practice, one thinks of the cosmos as remote. And what we have in mind under cosmic evolution is the changes that are postulated by the science of astronomy. It is believed by astronomers that our solar system with its central sun, its planets and lesser bodies has not always possessed its present form, although it has been in existence from a remote period in time. Our earth seems to have been once molten and before that perhaps gaseous. Although the famous Nebular Hypothesis of La Place has been in part replaced by other theories, the belief of modern astronomy is that our solar system and perhaps countless others have arisen by an evolutionary process whose extent is infinite in both time and space. I take it that few will combat the concepts of astronomy regarding the nature of our sun and its planets. Even when some of us were children the idea of cosmic evolution, as set forth by the nebular hypothesis, was taught in school geographies. The point is

[1] An address delivered before the Science Section of the Missouri State Teachers' Association, Kansas City, November 18, 1922.

not whether the nebular hypothesis, the planetesimal hypothesis or the like is correct, but that the astronomer regards the heavenly bodies as having reached their present state by an evolutionary change, continuous through an unfathomable past and presumably to be continued into a limitless future. There is no longer talk among intelligent or educated men—or there should not be—of "heaven and earth, center and circumference, created all together, in the same instant, and clouds full of water, on October 23rd, in the year 4004 B. C. at nine o'clock in the morning," as was determined by the chronology of Dr. John Lightfoot in the seventeenth century. The astronomical evidence for the development of such a dynamic universe in space and time is of course limited. But it all points in the direction of evolution.

GEOLOGIC EVOLUTION

Geologic Evolution overlaps with cosmic, since the geologist takes the evolutionary problem where the astronomer leaves it. Geology deals with the history of our earth, how it originated and how it has assumed its present form. Astronomy deals with the origin of the earth as a planet of our solar system. Geology finds evidence that the earth was once a molten mass which has since become cooler. What may be called the "countenance" of the earth is the subject matter of geology, how the land lies at the present day, how rocks and soil are being produced, and what these facts imply regarding historical origins. The evolutionary evidence of astronomy is vague and remote, although generally accepted by the layman. The evidence from geology is written in the ground beneath our feet. The geologist's belief in a vast lapse of time and stupendous changes rests upon evidence that is everywhere at hand. Leonardo da Vinci in the fifteenth century grasped the significance of important geologic facts, when he wrote concerning the saltness of the sea and the marine shells found as fossils in the high mountains. Since the publication of James Hutton's "Theory of the Earth" in 1795, it has been the cardinal principle of geological science that past changes of the earth's surface are explicable in terms of changes now in operation. For example, such a vast chasm as the Grand Canyon is explained not as produced by miraculous creation or by sudden catastrophe, but by running water acting upon the rocks throughout innumerable centuries. The process may be observed in miniature in the *wash* of the clay soil in our Missouri fields. The weathering of rock into soil, erosion with its transportation of the products of weathering, deposition of the material in the oceans or in large bodies of fresh water, uplift of the ocean's floors and its hardening into rock may all be seen in slow but certain progress in various parts of the world at the present day, and their occurrence in the past is recorded in the rocks. The sub-title of Charles Lyell's famous book, the "Principles of Geology," published in 1830, runs as follows: "An attempt to explain the former changes of the earth's surface by reference to causes now in operation." Lyell established the idea of evolution as the only reasonable interpretation of geological facts and his elaboration of Hutton's doctrines still constitutes the very foundation of geologic science. Today, geology without an evolution of the earth's surface, from a molten mass to its present form and extending over millions of years, would be on a par with a science of geography postulating a flat earth. The conclusions of modern astronomy and geology, therefore, point to an evolutionary process involving many millions of years and still in progress—to an earth hoary with age and still growing old.

So far so good. Astronomy and Geology despite their practical importance are remote from human concern, in so far as their

evolutionary doctrines are concerned. To borrow from the phraseology of Mr. Bryan, the *Age of the Rocks* is of no particular consequence in so far as the *Rock of Ages* is concerned. Cosmic evolution and geologic evolution are readily accepted by the laity on the authority of science, because they do not seriously interfere with doctrines that are deemed vital. But the evolution of plant and animal life, and hence human evolution, is inseparable from that of inorganic matter as described by astronomy and geology, because of the fossils in the rocks.

ORGANIC EVOLUTION

Organic Evolution resembles the cosmic and geologic evolution above described, since it concludes that the living bodies, which are the objects of its investigation, have not always existed as they are to-day, but have undergone a process of change. As with the evidence of geologic change, the evidence for an evolution of animals and plants rests upon facts that are immediately before us, for example, the structure and development of animals, their distribution over the earth, the fossils in the rocks. Our time will permit of only enumeration and brief characterization of the recognized lines of evidence for organic evolution, which are as follows:

1. Evidence from Structure is derived from:
   - Comparative Anatomy
   - Comparative Embryology
   - Classification
2. Evidence from Distribution, past and present, is derived from:
   - Palæontology
   - Zoogeography
3. Evidence from Physiology is derived from:
   - Fundamental Resemblances in Vital Processes
   - Specific Chemical Resemblance of closely related forms, *e.g.*, Blood Tests
4. Evidence from Experimentation rests upon:
   - Unconscious Experimentation upon Animals and Plants since their Domestication
   - Conscious Experimentation of Breeders and of Scientific Investigators

The nature of these lines of evidence may now be indicated.

Evidence from *Comparative Anatomy:* In the animal kingdom as a whole and in every group of animals whether large or small, we find facts that may be interpreted most reasonably in terms of evolution. The vertebrates or backboned animals will serve as an illustration. We find here a certain plan of structure, for example, backbone, two pairs of limbs, body, head, and various internal organs, all laid down according to a similar general plan, but with endless modifications to suit the mode of life. The flipper of a whale, the wing of a bird or a bat, the fore foot of a horse, the arm of a man, and the like, all show the same plan of structure. One of the pre-Darwinian ideas was that each animal, while created separately, was nevertheless formed in accordance with a certain ideal type that the Creator had in mind, hence the resemblance. Such an idea is a theoretical possibility, provided there is any evidence to show that animals were created all at once and separately. But there is not a shred of such evidence that will appeal to one who approaches the matter with an open mind and uninfluenced by preconceived notions.

On the other hand, the biological explanation of this anatomical resemblance is that the present vertebrates (fishes, amphibia, reptiles, birds and mammals) have all descended from a primitive race somewhat like the present fishes. All verte-

brates are now alike, because they have never lost the underlying plan of structure inherited from their common ancestry. They have come honestly and naturally by their present organization.

The *Evidence from Fossils* (Paleontology) interlocks with the above, since the first vertebrates known to appear were primitive fish-like forms. These were succeeded by Amphibians, Reptiles, Mammals and Birds in the order named, the last two having connecting links with the reptiles. The invertebrate groups tell a similar story.

Turning to the facts of *Comparative Embryology:* The kind of evidence everywhere discoverable may be illustrated by the gill-slits in the embryos of higher vertebrates like reptiles, birds and mammals. All these forms exhibit in their early stages of development a fish-like plan of structure, particularly in the neck region where the gill-slits are located. The reasonable interpretation of the existence of such structures in the embryo of a human being, or any land-living vertebrate, is that we have never lost these telltale evidences of our ancestry. The later stages of our development are modified so that they lead to the adult human body. The earlier stages still show the primitive conditions of a fish-like organization. Modern fishes have survived to the present day without a fundamental departure from the ancestral condition. Modern Amphibia (frogs, toads and salamanders) have survived in the half-way state between an aquatic and a terrestrial existence, through which higher vertebrates have passed as indicated by the fossil record and by the above fish-like stages in their development.

The facts of *Classification* are commonly cited as evidence for evolution. Since classification is based on structure (anatomy), this is but an aspect of the general evidence from comparative anatomy and embryology. While the facts cannot be detailed here, they are striking and bear out the doctrine.

Another line of evidence is that of *Geological and Geographical Distribution:* The facts in this connection are utterly senseless and insulting to an intelligent Creator, if viewed as a result of special creation. One can simply say, "God did it," and not ask why. But such explanations do not satisfy modern minds. On the other hand, their explanation in terms of evolution gives reasonableness and consistency to a large body of facts. The fossils appear in such an order in time as to constitute evidence for evolution. Existing animals are distributed over the surface of the earth in a manner that confirms their geological origins.

The facts of *Physiology* tell a similar story. Life and the living stuff is the same sort of thing wherever we find it, thus lending support to the idea that it has all descended from the same primitive source from which it has inherited its resemblances. A more striking line of physiological evidence is the recently discovered chemical resemblance between the blood of animals previously supposed to be closely related on grounds of their anatomical similarities, for example, apes and monkeys, birds and reptiles, and the like. Two entirely independent lines of evidence are here found to interlock to such an extent that evolution is the one reasonable interpretation.

Finally, there is the evidence from *Experimentation:* Evolution has taken place before the eyes of men, during the period since animals and plants were first domesticated. The changes have not been profound, because the ten or twenty thousand years since the first animals and plants seem to have been brought under domestication is a brief span of time for evolutionary modification. But it is clear that such modification has occurred and is to-

day occurring under the direction of skillful breeders. The modern science of genetics is beginning to solve the problem of how evolution takes place, although this question is one of extreme difficulty.

The foregoing summary of the various lines of evidence is hopelessly inadequate, since books could be written on each. The point to be appreciated is that all the multitudinous facts of biology hang together in a consistent fashion when viewed in terms of evolution, while they are meaningless when considered as the arbitrary acts of a Creator who brought them into existence all at once a few thousand years in the past. Modern biology has developed around two major generalizations, the Cell Doctrine, and the Doctrine of Organic Evolution. Modern evolutionism dates not from Darwin's "Origin of Species," published in 1859, but from the "Histoire Naturelle" of Buffon, the first volume of which appeared in 1749, and from the work of the other philosopher-naturalists of the eighteenth century. It is a sad comment upon the state of popular information that the practical facts of biological science are everywhere acknowledged, while the status of its greatest philosophical generalization remains so commonly unknown. In view of its implications and applications, the doctrine of evolution is second to none other in modern thought. It has been established by a gradual but irresistible accumulation of facts.

THE FACT, THE COURSE AND THE CAUSES OF ORGANIC EVOLUTION

At this point, we may examine a common misunderstanding with reference to evolution and the work of Charles Darwin. Suppose we begin with an analogy, illustrating what may be termed the *Fact*, the *Course*, and the *Causes* in a progressive series of events. A ship leaves a European port and sails across the Atlantic to New York harbor. We may distinguish between: (1) the Fact that the ship actually crossed the ocean, instead of being "created" in the harbor of New York; (2) the Course the ship may have pursued, whether direct or indirect, and the like; and (3) the Causes that made the ship go, whether an internal propelling force like steam or electricity, an external force like wind or current or even direction by wireless. Compared with the doctrine of evolution, we have: (1) the Fact of Evolution, as representing the historical series of events; (2) the Course followed in evolution, for instance, whether the land vertebrates arose from fish-like ancestors, birds from reptiles, or the like; and (3) the Causes of Evolution or what made and makes it happen. These three aspects, like those in the voyage of a ship, are separate through related items. They must be constantly distinguished, if there is to be any clear thinking on this matter by one who is not a scientist.

It is now possible to explain the misunderstanding above cited. The historical Fact of evolution seems attested by overwhelming evidence. Science has nothing to conceal, it stands "strong in the strength of demonstrable facts," and invites you to view the evidence. The Course pursued by evolution is known broadly in many instances, but in the nature of the case the evidence is limited and many of the steps will always remain uncertain, without, however, a calling in question of the historic fact. The Causes of evolution present the most difficult problem of all and the one regarding which we know the least. The recent strictures of Professor Bateson, which have been exploited by anti-evolutionists, were directed wholly at current explanations of evolutionary causation and the course of evolution. He affirmed his belief in the historic fact when he said "our faith in evolution is unshaken"—meaning by "faith," of course, *a reasonable belief resting upon evidence*.

With this distinction between Fact, Course and Causes clearly in mind, the significance of Darwin's work in the history of biological thought can be understood. Darwin's accomplishment was twofold. In the first place, he established Organic Evolution as the only reasonable explanation of the past history of living things. Secondly, he offered, in Natural Selection, what then appeared an adequate explanation for the origin of species and hence for the *causes* of evolution. Darwin's evolutionary argument in his "Origin of Species" was that one species could give rise to another "by means," as he believed, "of Natural Selection or the preservation of favored races in the struggle for life." If one species could be shown to give rise to another, the same process could be continued. No limit could be set. The types thus produced could depart indefinitely from the parent form. Once the mutability of species be admitted, the only reasonable conclusion is that evolution has taken place. His argument was supported by an immense collection of facts along observational and experimental lines. The total result was overwhelming, coming as it did more than one hundred years after the original promulgation of the theory of transmutation and its repeated rejection by the main body of naturalists. Evolution was accepted so quickly by scientists that the world was startled. This sudden conversion gave rise to the impression, even among scientific workers, that no serious contribution to evolutionary theory had been made before the work of Darwin. Such an impression does not represent the facts and it does grave injustice to the pioneer thinkers of the eighteenth century to whom we have alluded.[2]

Darwin's second accomplishment, Natural Selection, was accepted by science as a causo-mechanical explanation of evolutionary change. The cogent statement and the simplicity of the principle of selection were of great importance for its acceptance as the cause of evolution, along with the broader theory of evolution as the historic fact. Extended exposition of the selection process will not be attempted. It may be found in numerous elementary reference books, and in the early chapters of the "Origin of Species." The tabulation known as *Wallace's Chart*, which is an admirable outline of the argument, may be cited in this connection:

WALLACE'S CHART OF NATURAL SELECTION

Proved Facts	*Consequences*
A Rapid Increase of Numbers B Total Numbers Stationary	Struggle for Existence
C Struggle for Existence D Variation and Heredity	Survival of the Fittest (Natural Selection)
E Survival of the Fittest F Change of Environment	Structural Modifications

The importance of Darwin's work in the history of scientific thought is that it *convinced science of the truth of organic evolution and proposed a then plausible theory of evolutionary causation.* Since Darwin's time, evolution as the historic fact has received confirmation on every hand. It is now regarded by competent scientists as the only rational explanation of an overwhelming mass of facts. Its strength lies in the extent to which it gives meaning to

[2] Lovejoy, A. O., "Some eighteenth century evolutionists," *Popular Science Monthly*, July, 1904; also "The argument for organic evolution before the 'origin of species'," *Popular Science Monthly*, November, 1909. So strongly does the Darwinian tradition persist that the facts brought out in these two papers are still ignored in many of the current text-book and other elementary accounts of evolution.

so many phenomena that would be meaningless without such an hypothesis.

But the case of natural selection is far different. Of recent years, this theory of the causes of evolution has suffered a decline. No other hypothesis, however, has completely displaced it. It remains the most satisfactory explanation of the origin of adaptations, although its all-sufficiency is no longer accepted. The initial step in evolution is the *appearance* of individual variations which are perpetuated by heredity, rather than the *selection* of variations after they have appeared. The interest of investigators has shifted to problems of variation and heredity, as exemplified by the rise of the science of genetics.

As a result of this situation, there has been much discussion among scientists regarding the adequacy of what is often referred to as the *Darwinian Theory*, meaning *Natural Selection*. In condemning *selection* as an inadequate explanation of the problem, biologists have often seemed to condemn *evolution itself*. It is not strange that the layman, for whom Darwinism and evolution are synonymous terms, believes that evolution has been rejected when he hears that belief in Darwinism is on the wane. He does not understand that what is thus meant by Darwinism is not the historic fact of evolution, but the proposed cause of evolution—natural selection. This point may not seem vital, but those interested in biological science frequently find the situation used to support claims that the entire concept of organic evolution has fallen into disrepute. There are many, even to-day, who rejoice at anything that appears to weaken this major generalization of biology.

Such then is the more strictly scientific status of the Doctrine of Evolution as a whole. The origin, by evolution, of the heavenly bodies and of our earth is evidenced by facts of astronomy and geology, as set forth in any elementary treatise on these sciences. Inorganic Evolution or the modification of non-living matter is thus supported by science and does not find serious opposition in the public mind. Organic Evolution or the origin of animal and plant life receives a similar support from the facts of biology. If the origin of man were not involved, there would presumably be little serious opposition from non-scientific sources at the present day.

HUMAN EVOLUTION

But with the evolution of all other living things, both animal and plant, overwhelmingly attested by the facts, it is not only impossible but puerile to separate man from the general course of events. Moreover, the evidence for man's origin is becoming clearer year by year. Comparative Anatomy, Embryology, Classification, Physiology, Geographical Distribution, Fossils, and the Existing Races of Mankind tell the same story for man as for the rest of the animal world.

Huxley's essay, entitled "Man's Place in Nature," presents in a masterful manner the anatomical evidence for our kinship with the four species of tailless apes—the Gibbon, Gorilla, Orang and Chimpanzee—and his most significant conclusions are even more strongly established at the present day. If creation occurred "at 9:00 A. M., on October 23, of the year 4004 B. C.," as part of the Divine Plan, it is amazing that such success should have dogged the steps of the students of human skeletal and cultural remains during the last half century. The skeletons in part or in whole are known for a number of sub-human races and a vast array of implements and other remains, all showing a progressive advancement. By another fifty years, it seems safe to expect that much more of the story will be unveiled. It is further amazing that investigations in

Egypt show the existence of a flourishing civilization in the Nile Valley as early as 5000 B. C., and back of this a gradual development from the barbarism of the stone age.

On man's intellectual side, psychology is making increasingly evident the essentially animal foundation of human intelligence. Man's claim to importance in the universe revealed by science lies not in the pretense that this planet was created for his convenience, but in the claim that he transcends the material universe in so far as he comprehends it. And the method of such comprehension that dominates modern thought is the method of science, not that of theology.

THE PRESENT CONTROVERSY

The current furor over Evolution, therefore, narrows down to the case of man. The question of human beginnings is one that is open to investigation like any other historic or pre-historic event. In this connection a quotation from a famous essay by Herbert Spencer, published in 1852, is appropriate: "Those who cavalierly reject the Theory of Evolution," writes Spencer, "as not adequately supported by facts, seem quite to forget that their own theory is supported by no facts at all. Like the majority of men who are born to a given belief, they demand the most rigorous proof of any adverse belief, but assume that their own needs none. Here we find, scattered over the globe, vegetable and animal organisms numbering, of the one kind (according to Humboldt) some 320,000 species, and of the other, some 2,000,000 species (see Carpenter); and if to these we add the numbers of animal and vegetable species that have become extinct, we may safely estimate the number of species that have existed, and are existing, on the earth, at not less than ten millions. Well, which is the most rational theory about these ten million of species? Is it most likely that there have been ten millions of special creations? Or is it most likely that by continual modifications, due to change of circumstances, ten millions of varieties have been produced, as varieties are being produced still?"

And one might add in connection with the present controversy something like the following: If the evidence indicates that all other species have arisen by evolution, is it probable that man, whose bodily structure and functions are so nearly identical with those of the mammalia and particularly the primates—that man arose in a different fashion? We have, moreover, as above indicated, the positive evidence to support this general presumption.

The famous retort made by Huxley to the great Bishop Wilberforce may be recalled in this connection. History sometimes repeats itself in matters of scientific controversy. The occasion was the meeting of the British Association for Advancement of Science in 1860, the year following the appearance of Darwin's "Origin of Species." We quote with some omissions from Huxley's "Life and Letters."

From the scientific point of view the Bishop's speech was of small value. It was evident from his mode of handling the subject that he had been "crammed up to the throat," and knew nothing at first hand; he used no argument beyond those to be found in his Quarterly article, which appeared a few days later, and is now admitted to have been inspired by Owen. "He ridiculed Darwin badly and Huxley savagely; but," confesses one of his strongest opponents, "all in such dulcent tones, so persuasive a manner, and in such well turned periods, that I, who had been inclined to blame the President for allowing a discussion that could serve no scientific purpose, now forgave him from the bottom of my heart."

The Bishop spoke thus "for full half an hour with inimitable spirit, emptiness and

unfairness. In a light, scoffing tone, florid and fluent, he assured us that there was nothing in the idea of evolution; rock-pigeons were what rock-pigeons had always been. Then, turning to his antagonist with a smiling insolence, he begged to know, was it through his grandfather or grandmother that he claimed his descent from a monkey?"

This was the fatal mistake of his speech. Huxley instantly grasped the tactical advantage which the descent to personalities gave him. He turned to Sir Benjamin Brodie, who was sitting beside him, and emphatically striking his hand upon his knee, exclaimed, "The Lord hath delivered him into my hands." The bearing of the exclamation did not dawn upon Sir Benjamin until after Huxley had completed his "forcible and eloquent" answer to the scientific part of the Bishop's argument, and proceeded to make his famous retort.

On this Mr. Huxley slowly and deliberately arose. A slight, tall figure, stern and pale, very quiet and very grave, he stood before us and spoke those tremendous words —words which no one seems sure of now, nor, I think, could remember just after they were spoken, for their meaning took away our breath, though it left us in no doubt as to what it was. He was *not ashamed to have a monkey for his ancestor; but he would be ashamed to be connected with a man who used great gifts to obscure the truth.* No one doubted his meaning, and the effect was tremendous. One lady fainted and had to be carried out; I, for one, jumped out of my seat.[4]

[4] Unfortunately, we have no record of Huxley's exact phraseology, as he spoke extemporaneously. The fullest and probably most accurate account of these concluding words is the following, from a letter of the late John Richard Green, then an undergraduate, to his friend, afterwards Professor Boyd Dawkins: "I asserted—and I repeat—that a man has no reason to be ashamed of having an ape for his grandfather. If there were an ancestor whom I should feel ashamed in recalling it would rather be a man —a man of restless and versatile intellect—who, not content with an equivocal success in his own sphere of activity, plunges into scientific questions with which he has no real acquaintance, only to obscure them by an aimless rhetoric and distract the attention of his hearers from the real point at issue by eloquent digressions and skilled appeals to religious prejudice."

Having outlined the evidence for human evolution and stated the presumption in its favor, let us turn to the evidence for special creation, as found in Genesis. Science and common sense alike have the right to inquire regarding the nature and sources of this account, if it be regarded as a true statement of the facts. Science faces the matter squarely, demanding only the right to investigate and draw unprejudiced conclusions. The results of such investigations are not in doubt. It appears that the races about the eastern Mediterranean, like other primitive peoples, had their traditions of the origin of the world. The story in Genesis apparently descended to the early Hebrews and to their neighbors in Mesopotamia from a source far antedating the appearance of the Jews as a people and their sacred writings. Archeology and ethnology most reasonably indicate that in its origin this Hebrew-Babylonian tradition was no more dignified than the creation stories of our North American Indians and no nearer the scientific truth. We take the story in Genesis seriously as an account of pre-historical facts, merely because it is *our* story of creation passed down by tradition from *our* fathers. It is and will remain sacred and interesting, because it has been woven into the thought of western culture for almost two thousand years and because of its intrinsic literary and moral qualities.

But the past history of events, whether of human or animal origins, is subject matter for scientific inquiry, and the answer

of science is Evolution. The very great antiquity of Man, the existence at an earlier period of beings, man-like, but intermediate between man and other primates, together with the facts of man's anatomy, his embryology, his physiological reactions, even his mentality, all point to his bodily kinship with the rest of living nature. It is not that men came from monkeys, but that men, monkeys and apes all came from a common mammalian ancestry millions of years in the past.

For those whose religion is still based upon belief that our Bible was the direct and detailed word of God to man and true in all particulars, the evolutionary point of view is naturally disturbing. It means a profound reconstruction of religious beliefs. Perhaps the most serious charge intellectually that can be drawn against certain of the clergy in the present controversy is that they have kept themselves, and thereby their congregations, largely in ignorance of the facts of modern thinking in science and philosophy. At the present time it is hard to say which is to be the more condemned, the minister who is so ignorant as to deny the facts of evolution or the one who knowing the facts ignores them, because he fears to attempt a reconstruction of his religion along modern lines. The acknowledged impotence of the Church in the intellectual life of our day is in part traceable to this cause.

It is more reasonable to believe that the Bible is a human document, representing the history of an advance from the concept of a barbarous and vengeful Jehovah of the earlier Old Testament, through the God of righteousness and justice of the later prophets, and culminating in the concept of a Father as preached by Jesus of Nazareth. Man is perhaps "the noblest work" of whatever Power is responsible for our visible universe, although men's conduct frequently belies such a conclusion. It is certainly true that the concept of a Loving Personality at the heart of the world, and with whom man may come into communion, is "the noblest work of man" within the realm of thought and feeling, whatever some may think regarding its limitations as a matter of fact.

Is not the conclusion of the whole matter:—that in the long run religion must square with facts; and facts are the business of science. "Facts are stubborn things that will not be denied," and it is the faith of the scientist that only when we know what is true, that is to say, what are the facts, can we do what is right.

Our forefathers once imagined the Islands of the Blest to lie beyond the Atlantic and the Inferno of lost souls to be within the bowels of the earth. There are some who think the passing of such ideas is a calamity. But what a vista has been opened! Consider the sweep through time and space of the concept of evolution: The measureless past even of our own planet, the cooling of the gaseous and later molten mass, the differentiation of the land, the seas, and the atmosphere, the appearance of the earliest life, and its succession through time, the age of invertebrates, the ages of fishes, amphibia, reptiles and mammals, the emergence at length of the ape who walked like a man and the struggling ascent of his descendants during the Glacial Epoch. The account of creation in Genesis, when compared with the tale outlined by modern science, is like some nursery story, cherished as part of a departed childhood and wonderful in its proper setting, but not to be classed with the great symphony made known by science, although having its place in legendary literature.

"A fire-mist and a planet,
A crystal and a cell,
A jelly-fish and a saurian,
And caves where the cave-men dwell;
Then a sense of law and beauty,
And a face turned from the clod,
Some call it Evolution
And others call it God."

SOCIAL ASPECTS

In the foregoing discussion we have considered the intellectual aspects of the doctrine of Organic Evolution. There remain its social aspects. Evolution is one of the basic concepts in modern thought. Suppression of a doctrine established by such overwhelming evidence is a serious matter. From the standpoint of the teacher the situation has more than academic interest, as may be illustrated by a concrete example:

Mr. F. E. Dean, a graduate of the University of Missouri, was superintendent of schools in Fort Sumner, New Mexico. For several years he had been teaching high school electives in Sociology and Psychology, making of course the natural and necessary references to the doctrine of evolution. There were rumblings, but he felt that by giving due consideration to prejudice he was making progress in the introduction of both his students and the community to an important phase of modern thought with which many were unacquainted. In the spring of the present year there arose opposition as the result of influences outside the community. But when Mr. Dean left Fort Sumner to take up summer work in the University of Chicago, the situation did not seem serious. However, following his departure certain local interests seem to have exerted pressure, with the result that he received a brief communication from his school board to the effect evolution should not be taught in the Fort Sumner schools and any teacher so doing should be dismissed. Feeling that he could not immediately tender his resignation, Mr. Dean briefly acknowledged the notice and stated that he acquiesced in the ruling. But he resolved that once back on the ground, with a fair chance to defend his position, he would state his case to the community. In the meantime he consulted the State Superintendent of Schools, as to the authority of local school boards in such a matter. This gentleman in turn consulted the Attorney General, who gave it as his opinion that, since evolution was taught in all the leading higher institutions of learning and was a well-established doctrine, the local board had no such authority. The state superintendent then gave publicity to both this opinion and Mr. Dean's letter. Whereupon the local board dismissed Mr. Dean on the ground of insubordination, plus his well-known views regarding evolution.

Personally, Mr. Dean is a man of substantial intellectual attainments and one who since graduation has advanced his professional training by systematic study in summer schools and extension courses. In the language of Mr. Brooke, the one member of the local school board who seems to have stood for the freedom of teaching and a square deal for the teacher, "Mr. Dean was loved and honored by our best people. Two thirds of the community were with him and prejudice on the part of the board influenced by a given organization caused his removal."

In a statement published in the Fort Sumner *Leader* for August 25, 1922, Mr. Brooke further explains how the real cause for Mr. Dean's removal was the political intrigues and ambitions of other members of the school board. He charges that a political deal was made to replace Mr. Dean by another man in return for the latter's support in a certain district of the county. As these statements by Mr. Brooke are clearly libelous, it is a fair presumption that he can prove their truth.

But from the standpoint of the teaching profession, it is immaterial whether Mr. Dean was dismissed primarily because of his teaching of evolution or whether prejudice against him was used as a cloak for more unworthy conduct. The fact is that individuals on this local board were able thus to use ignorance and prejudice. Other such cases have occurred and may occur again. Our interest as teachers lies

in the repression of a doctrine well established within the province of science. Mr. Dean was dismissed for teaching what is commonly held among those who by education and intelligence are competent to pass judgment. The claim that educated and intelligent men in general accept evolution as an established fact can be substantiated on every hand by statements from authorities in both education and public affairs. Science does not base its claims upon such opinions of individuals, however authoritative, but upon *facts*. Nevertheless, the opinions of the competent have weight. For example, an opponent of Mr. Dean's stated in the Fort Sumner paper that ex-President Wilson did not believe in evolution. Such a statement was obviously ridiculous, but Mr. Dean felt that it would have weight and was at a loss to deny it. The writer proposed that a direct inquiry be addressed to Mr. Wilson together with a full explanation of the circumstances. I am happy to state that the reply was immediate and unequivocal. It runs as follows:

Washington, D. C.
29th August 1922

My dear Professor Curtis:

May it not suffice for me to say, in reply to your letter of August twenty-fifth, that of course like every other man of intelligence and education I do believe in Organic Evolution. It surprises me that at this late date such questions should be raised.

Sincerely yours,
WOODROW WILSON

Professor W. C. Curtis,
Columbia, Missouri

If the speaker is correctly informed, Mr. Bryan has recently declared from his Chautauqua platforms that he defies any son-of-an-ape to show that he (Bryan) is neither intelligent nor educated. I make no comment upon what an intelligent and educated ex-President perhaps thinks of the mental caliber of an ex-Secretary of State.

One suspects that the current agitation against evolution is part of the post-war reaction. It seems inconceivable that a doctrine so firmly established as a scientific principle can now be seriously questioned. For in the long run naught can stand against a matter of fact. And yet, Dark Ages may come again. The decline of the intellectual foundations of western culture may be at hand and with it the fall of the material attainments, which the most ardent anti-evolutionists seem willing to accept in matters of physical convenience. I have elsewhere stated at length my belief that the significance of science in modern life is spiritual rather than materialistic, using the former term in its broader meaning.[5] If we are to conclude this discussion in terms of larger meanings, I can think of no more fitting sentences than the closing words of an address delivered by that distinguished Missourian, Glenn Frank, at the last commencement of our state university:

"During the next twenty-five years western civilization will either go to a rendezvous with death or to keep an appointment with a high destiny. It lies pretty largely with us to say which. I have spoken," continues Mr. Frank, "of the outlook for western civilization more emotionally than befits a supposedly careful analysis. I could not help it. I have a son who will reach his majority during these fateful twenty-five years that lie ahead."[6]

Ladies and gentlemen, members of the Science Section, it is my conviction that the present storm against organic evolution is but an expression of malign influences of prejudice and ignorance, hostile to what we may envision as the high destiny of our western world.

[5] "Science and human affairs," 1922.

[6] The substance of Mr. Frank's address appears in his article in the *Century Magazine* for June, 1922, but minus this particular quotation.

LIST OF BOOKS ON EVOLUTION AND RELATED SCIENTIFIC MATTERS OF INTEREST TO THE NON-SCIENTIFIC READER

1. Barrell, Joseph, *et al.*, "The evolution of the earth and its inhabitants," Yale University Press.
2. Conklin, E. G., "The direction of human evolution," Scribners.
3. Curtis, W. C., "Science and human affairs," Harcourt, Brace & Company.
4. Drummond, H., "The Ascent of man," James Pott & Company.
5. Ellwood, C. A., "The reconstruction of religion," Macmillan.
6. Fosdick, H. E., "Evolution and Mr. Bryan," Popular Religious Leaflets, "Science and Religion" Series, Am. Inst. of Sacred Literature, Chicago, 1922; also in same series, Conklin, E. G., "Evolution and the Bible," and Matthews, Shailer, "How science helps our faith."
7. Herbert, S., "The first principles of evolution," Macmillan (A. & C. Black).
8. Johnson and Popenoe, "Applied eugenics," Macmillan.
9. Kellogg, V. L., "Darwinism to-day," Holt & Company.
10. Lull, R. S., "Organic evolution," Macmillan.
11. Lull, R. S., *et al.*, "The evolution of man," Yale University Press.
12. Osborn, H. F., "Men of the old stone age," Scribners.
13. Osborn, H. F., "The origin and evolution of life," Scribners.
14. Romanes, G. J., "Darwin and after Darwin," (1) "The Darwinian Theory," Open Court Publishing Company.
15. Scott, W. B., "The theory of evolution," Macmillan.
16. White, A. D., "A history of the warfare of science with theology in Christendom," 2 Vols., Appleton.

W. C. CURTIS
UNIVERSITY OF MISSOURI

GRADING AND PROMOTION[1]

GRADING A MODERN DISCOVERY

WITH your permission I am going to remind you of a bit of educational history, merely to impress upon your mind a truth that Solomon uttered about three thousand years ago—that there is nothing new under the sun. Class teaching seems to be a modern discovery. In schools it has now become a universal practice, so that it is difficult for young teachers to imagine any other procedure. Yet up to the seventeenth century all school teaching was done by the individual method. Even when there were numbers of children in the same class they were instructed one at a time. Brother Azarias (*Essays Educational*, 1896), offers in evidence an old print of the sixteenth century in which are depicted the features of a classroom of the time. The teacher is seated in an armchair with a hat on his head and a mantle on his shoulder. In his hand is a bundle of rods and on his lap an open folio. A boy is standing by who has just recited his lesson, while the master is earnestly talking to another pupil who has come late and will probably be beaten with one of the rods. A long table runs down the centre of the room at which boys stand in various attitudes with open books before them. A similar engraving dated 1493 makes it evident that the teacher employs exclusively the individual method. Each boy in turn stands before the master, recites his lesson, and resumes his seat.

In precisely the same way I myself learned to read, write, and cipher in a rural school of Pennsylvania. About four times a day the youngest children stepped up to the desk, one at a time, and recited their A, B, C's out of a book which the master held on his knee. Between these recitations the pupils occupied their time by copying letters or figures on a slate out of a book, or by getting into mischief. The writing lesson was done on a slate or a sheet of foolscap, the master setting the copy. The entire school was thus engaged once a day in learning to write, each pupil having an individual copy made by the teacher.

An anonymous pamphlet issued about 1680 criticizes the wastefulness of the in-

[1] Discussion before a meeting of the New York Society for the Experimental Study of Education at Washington Irving High School on February 9, 1923.

dividual method employed in elementary education. The author says: "In our colleges we find pupils of the same capacity placed in the same class; why is not the same done in primary schools?" Other writers of the time register a similar complaint. Brother Azarias gives Peter Fourrier the credit of having first explained the class system of instruction in a book published in 1640. The system was then known as the "simultaneous method." It can not be fairly said, however, that the simultaneous method was the invention of any one man. Comenius, nine years before Fourrier published his book, issued his celebrated *Janua Linguarum*, in which he asks: "How can one teacher suffice for any number of pupils?" and replies "That not only can he suffice, but that it is for the benefit of the class that there be a large number, inasmuch as it excites sympathy and emulation." He ends with the slogan: "*One teacher, one book, one lesson for all in the same grade.*"

That was a radical proposal in the year of grace 1631.

Two hundred and seventy years later, 1901, P. W. Search published his book entitled *An Ideal School*, the object of which was to prove that the simultaneous method of teaching is a failure and therefore the individual method should be employed. Mr. Search would have daily promotion. These are his very words: "Every day should be a beginning day, and never in the life of a child should such an abnormal thing as non-promotion appear." Therefore, Miss Noonan, the eight-year course of study would require about two hundred equidistant divisions for each year, or sixteen hundred for the entire course! Mr. Search, however, presents the scheme as a novel invention of his own instead of the forgotten practice of by-gone ages which it really is.

It is twenty-two years since Search wrote his book, and we are still working on the problem of eliminating the evils of the simultaneous method. Search's remedy is like the celebrated cure for a mad dog: Cut off his tail close behind his ears! We do not believe the case of grading requires a remedy quite so heroic.

SOME LIMITATIONS OF SCIENTIFIC TESTS

There is, as Colvin insists (Colvin, not Calvin!), some danger in educational predestination. We may decide that a certain pupil is of the elect, when he really is destined to be damned; and conversely we may assign him to the non-elect when in fact he is destined to see salvation. This is because our tests even at their best and by intention measure only intellect; whereas emotion and will and that bundle of habits and attitudes which we call character are the most significant part of the total personality. Ezekiel Cheever is a radical, a free lance, an iconoclast and several more evil-sounding things you may choose to call him; but he often speaks words which, though disagreeable and rude, are nevertheless true. For instance:

"The I. Q. takes into account only two measurements—mental age and chronological age. Prince Scientist Educator . . . should know that three dimensions are necessary in order to find the size of a head, whether it be round or square. . . . The most serious blunder made by the measurement people is that they have consistently neglected to determine the C. S. C., which, when multiplied by the I. Q., gives the A. S. V., and the A. S. V. of the man is the only factor of permanent significance." (*Cheever's School Issues, October*, 1922, *Warwick & York, Inc.*)

In this quotation C. S. C. is the abbreviation for "common sense coefficient," and A. S. V. stands for "actual social value." Mr. Cheever's formula therefore means that the common sense coefficient multiplied by the intelligence quotient gives the actual social value of the individual. He

concludes thus: "The blunder of the educational world at present is that it sees everything from the standpoint of I. Q., and I. Q. is not a standpoint at all; it is a starting point to the A. S. V. . . The next step in education is to find a rule for ascertaining a subject's C. S. C. and, if practical, a constitutional amendment should be passed prohibiting any I. Q.er with a C. S. C. of less than .50 to practice."

All this is very severe and bitter and satirical and sounds like the ravings of a man who has a personal grievance. But when I see what the children in some of my ungraded classes are doing I am persuaded that Brother Cheever may be uttering a solemn truth. The children are selected for these special classes on account of their low I. Q.'s. Yet they do sewing and embroidery and weaving and lace-making and other handicraft work of the highest artistic and utilitarian value. Even academic culture is not entirely without their reach. One class entertained me some time ago with an exercise on current events. The lesson took the form of an imaginary journey to Washington, with visits to the White House, Congress, the Congressional Library, and an account of what may be seen or heard in the places visited. Each girl had a current events book, neatly kept and illustrated, containing also clippings and hand-notes on important items of public interest. The question is, may not some of these girls, low mentality though they have, with their deft fingers and generous social spirit, become better citizens than many a brilliant pupil with low morality and anti-social attitude? The answer is found in the penal institutions of the world, where many men of high intelligence are incarcerated for their misdeeds. Their A. S. V. is infinitely below that of some whom we call dull or stupid.

"Knowledge to their eyes her ample page,
Rich with the spoils of time, did ne'er unroll."

Nevertheless—

"Let not Ambition mock their useful toil,
Their homely joys, and destiny obscure;
Nor Grandeur hear with disdainful smile
The short and simple annals of the poor."

Abraham Lincoln expressed the same idea when he said that the Lord must have loved common people since he made so many of them.

THE EXPERIMENTAL SCHOOL

In my present district I have had three schools reorganized on the basis of scientific measurements. One was measured under the direction of Professor Leta S. Hollingworth, another by Professor McCall and his staff. The third is an experimental school and was measured by Mr. Nifenecker. In no case have we thought it wise to make revolutionary changes. Public School 11, on the basis of these tests, organized a "Terman Class" for the children of high I. Q.'s and three or four opportunity classes for those with low I. Q.'s. The rest of the school retained its normal status. Public School 107 (which is a small school) organized an opportunity class for the very slow pupils; reorganized some classes so as to group children with similar "promotion quotients"; and made provision for the rapid progress of children with I. Q.'s of 130 or over.

Public School 3 is our experimental school. It is a Junior High School. The seventh, eighth and ninth years were not included in the experiment because of the complexity of the program and the fact that all the children had already taken intelligence tests. The first three years were excluded in all experimental schools. Hence we had left only the fourth, fifth and sixth grades for our experiment. The outstanding discovery in Public School 3 is the fact that we have enough subnormal pupils in these six grades for two additional ungraded classes. There are now four such classes in the school. These chil-

dren had hitherto been scattered in regular classes, where they were hopelessly beyond their depth, and the teachers were vainly trying to keep them afloat.

The grade distribution indicated by the combined results of intelligence and achievement tests is so wide in range as to cast doubt upon the validity of the measurements. If we had taken the results at their face value our fourth year pupils would have been distributed among all the grades from 2A to 6B inclusive.* I have examined this school class by class, from top to bottom, during four successive years, and from what I learned by these personal tests and inspections I am disposed to trust the judgment of the principal and teachers rather than the accuracy of the tests. We followed the scientific tests, therefore, only in so far as we had corroborative evidence. We did not degrade any pupils (except those that went to ungraded classes), nor did we jump any from 4B to 6B. We relied upon the C. S. C. of the principal, the teachers, and Dr. Ruth Clark, the psychologist who studied all available data.

In order to add the scores of the various tests of achievement and intelligence for the purpose of securing a composite score, it is necessary to reduce results to a common denominator. This denominator is in terms of the pupil's age in months. The raw score of each achievement test is converted into months. Then the different school subjects are weighted. For instance, reading would be 6, geography 3, spelling 2, arithmetic 4, etc. Multiplying the educational age of a given subject by the number representing its weight, we obtain the weighted educational age. The sum of products divided by the sum of the multipliers gives us the average educational age of the pupils. For instance, a child receives a raw score of 12 in the Otis arithmetic test. This gives him an Otis arithmetic age of 177 months. The test has a weight of 2, hence the weighted Otis arithmetic age is 354 months. The total of the weighted ages for this pupil is 3265. Dividing this by 20, the sum of the weights, we obtain an educational age of 163 months.

If we divide the educational age by the chronological age we obtain the achievement quotient. And the achievement quotient determines the grade placement. For every pupil tested we calculated the I. Q., the E. Q., and the A. Q., and the resulting grade placements were tabulated and charted.

In order to determine a pupil's final placement we considered the educational grading, the intelligence quotient, the present grade, and the teacher's judgment of accomplishment. If, for instance, a girl was in 5A and had an educational grading of 4B, an I. Q. of from 85 to 100, and was recommended by the teacher for promotion, we placed her in the lower section of 5B. If her I. Q. was between 100 and 110 she went to the higher section of 5B. If she was not recommended for promotion by her teacher, and, according to her I. Q., could have done better work than she did, she was put into an opportunity class.

A few children who had B report cards but extremely low placement records—about twenty-five in all—were temporarily held back for further investigation. A typical case of this sort is a girl who had been two terms in 5B, had a B card, an educational grade of 5A, a mental grade of 4B, and an I. Q. of 82. This child, though of low mentality, had managed, by exceptional industry, to make rapid progress, and was a year ahead of her normal grade. The tests revealed many such exceptional cases which routine administration had hitherto overlooked. These incidental discoveries alone are almost worth the labor of the entire testing program. Some of the extreme misplacements indicated by the achievement quotient were due to the fact that the child's chronological

age had been incorrectly recorded by the school and thus all the calculations were rendered worthless.

CONCLUSION

The conclusion of the whole matter is indicated by the following anecdote:

"Jim," said the farmer, "have you fed the horses?"
"Yassir."
"What did you feed 'em?"
"Hay."
"Have you fed the cows?"
"Yassir."
"What did you feed 'em?"
"Hay."
"Did you feed the ducks?"
"Yassir."
"What did you feed 'em?"
"Hay."
"Did they eat it?"
"Nawsir: dey didn't exactly eat it, so far as I saw, but dey was talking about it when I lef'."

We have made a fetish of a uniform course of study adapted to the mythical "average child." We have fed hay to horses, cows and ducks without a careful inquiry as to whether they ate the fodder. Another story will help to make the matter clear. Dr. John Hall and Sam Jones were asked to explain how they prepared sermons intended for college students. Dr. Hall told his plan first, giving the impression that it required some condescension on his part to adapt himself to so youthful an audience. Sam Jones said: "Whenever I preach, whether the audience is young or old, rich or poor, wise or simple, I always put the fodder on the ground, where any one can reach it from a rat to a giraffe!"

In our course of study much of the material is entirely beyond the reach of some of the pupils. What we now need is to ascertain the capacities of our children and then give the rats and the ducks a chance by putting their fodder on the ground.

JOSEPH S. TAYLOR
DISTRICT SUPERINTENDENT OF SCHOOLS,
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EDUCATIONAL EVENTS

THE DIMINISHING ATTENDANCE IN FRENCH PUBLIC SCHOOLS

THE effect of the war upon France is strikingly revealed in the diminishing attendance in the public schools of the nation, according to a recent report in the *Detroit News* by Mr. W. R. Kelsey, staff correspondent, writing from Paris. The enrollment has fallen a million and a half in the past ten years and will continue to fall at a more rapid rate as the pre-war classes still in the schools are replaced by the smaller number of six year old children born during "the black years of the war, 1917 and 1918."

The decrease in school attendance has created many political issues, including the dismissal of many teachers whose services are no longer essential, the redistribution of school funds equally among public and private schools, and the organization of a single system of public education to take the place of the now existing parallel system of elementary and secondary schools.

At present there are in France public elementary schools providing an eighth-grade education for school children who are not able to go further with their school work. But side by side with these exist the lycées, secondary schools with a 12-year course, designed for pupils who expect to enter colleges or technical schools. Many claim that the system is undemocratic, in as much as it favors the wealthy classes.

"The post-war conditions in France, including the poverty of the intellectual classes, have raised the question whether the entire system of secondary education ought not to be reformed; there is a fear that because of the hardships imposed by the high cost of living, the number of students preparing for college will diminish and the intellectual life of France be threatened." They want the "bourse" system—scholarships awarded to poor scholars who have shown themselves of exceptional ability—to be supplanted by some system which will make it possible for more pupils to attend the lycées.

INTERNATIONAL AUXILIARY LANGUAGE

RESOLUTIONS adopted at a conference in New York City on March 24 urged that the

question of an international auxiliary language be given "serious and competent consideration" by an international institution of research. No specific language was mentioned in the resolutions, *The New York Evening Mail* reports, the group desiring to leave to the research body the question of determining which is best. Esperanto and Ido are among those which have been advanced.

Dr. F. G. Cottrell, chairman of the committee on an international auxiliary language of the National Research Council, the principal speaker, stated that science in the last fifty years has developed "from historical science to synthetic science, and the time has come for the linguist, philologist, historian, psychologist and sociologist to evolve a synthetic language."

"Stenography is the first step in this direction," Dr. Cottrell said. "It is a business 'language' of a direct nature. An internationally accepted medium of communication would mark another great milestone on man's pathway from savagery to full work consciousness without in the least disturbing any of the functions and associations which cluster about the mother tongue of every land."

Dr. Cottrell said there were three possibilities for the development of such a language—the use of one of the modern tongues, the use of one of the dead languages or the use of an artificial language, such as Esperanto or Ido. He told of attending the last Esperanto congress, where 2,100 delegates spoke in the language and an entire play was presented in it. He has studied the problem in twelve different countries.

Dr. John H. Finley acted as chairman of the conference, which was held at the residence of Mr. and Mrs. D. H. Morris. Others who spoke were Sidney E. Mezes, president of the College of the City of New York; Stephen P. Duggan, director of the Institute of International Education, and John J. Carty, vice-president of the American Telephone and Telegraph Company.

THE STERLING CHEMISTRY LABORATORY AT YALE UNIVERSITY

IN connection with the sixty-fifth annual meeting of the American Chemical Society at Yale University last week, there was dedicated the new $2,000,000 chemistry laboratory of Yale, built and equipped with funds of the estate of the late Mr. John W. Sterling, an alumnus, and named in his honor the Sterling Chemistry Laboratory. Greetings were extended to Yale from representatives of eight foreign nations and from universities of every state in the union. The total attendance at the exercises and the sessions of the society meeting was about 1,800 chemists and educators.

In his acceptance of the building, President Angell said: "On this spot generation after generation of eager youth will be taught to recognize, obey and direct to man's need the fundamental laws of nature. Here the ablest minds will delve continually into nature's secrets, unlocking her treasures for the increasing happiness of mankind."

The new building is one of the finest in the world, and is built on a new architectural principle. The main portion is constructed on three sides of a square, three stories high, and is in harmony with other buildings on the campus. In this building are class and lecture rooms, private laboratories and offices. Enclosed in the square is a one-story, sawtooth roof type of factory building, with movable partitions. This structure can be varied to suit the needs of the teaching staff. It is constructed to give the maximum of light and air and equipped so that it can be converted into several small workshops or one large shop, equal in size to a small commercial chemical plant.

At the dedication exercises an address was given by Dr. Edgar Fahs Smith, former provost of the University of Pennsylvania, on "The history of chemistry in America, with special reference to Yale." Following the dedication there was a luncheon at which the speakers included Professor Theodore W. Richards, of Harvard University; W. Lash Miller, of the University of Toronto; A. P. Hollman, of Amsterdam; Theodore Svedberg, of Upsala University, Sweden; Fred G. Donnan, University of London; Principal James G. Irvine, St. Andrew's University, and Georges Urbain, Paris. In the evening Sir Joseph Thomson, master of Trinity College, Cambridge, gave an address on "The unity of physics and chemistry."

THE CANADIAN NATIONAL CONFERENCE ON EDUCATION AND CITIZENSHIP

DELEGATES from all parts of Canada attended the National Conference on Education and Citizenship held at Toronto during the first week of April. The list of speakers was scheduled to include: Sir Michael Sadler, vice-chancellor of the University of Leeds; Sir Henry Newbolt, author and educator; Sir Robert Baden-Powell, founder of the Boy Scout and Girl Guide movements; Lady Baden-Powell, chief Girl Guide, and Lord Robert Cecil.

The French government, through its department of public instruction, appointed Professor Carre, Professor G. de Champris and M. Julien J. Champenois to be delegates and speakers at the conference.

The program included these main topics: Language expression; literature as the gateway to knowledge; literature and leisure; literature and the bible; biography in education; literature and international understanding; education and self control; education and fellowship; education as character development; manners as a social language; personality as the expression of character; the intrinsic value of personality; education and life.

On April 4 the Mendelssohn Choir, under the direction of Dr. H. R. Fricker, gave a program illustrative of the theme "Music and Life."

An exhibition of school work showing aspects of education in New Zealand was provided by the government of New Zealand. India and the West Indies, besides Great Britain and Newfoundland, also sent exhibits. In addition the various national organizations, such as the Junior Red Cross, the Girl Guides, Child Welfare Association, Rotary Boy's Work Committee, Home and School Association and other organizations had special exhibits. Other features were exhibits by the United States Bureau of Education, the English Board of Education, a collection of school magazines of Great Britain, and a photographic exhibit of the schools and colleges of India.

SCHOOLMEN'S WEEK AT THE UNIVERSITY OF PENNSYLVANIA

THREE thousand persons—public and private school superintendents, principals, members of school boards and normal school and college teachers of education—are in attendance at the sessions of Schoolmen's Week held on April 12, 13 and 14 at Philadelphia, under the auspices of the University of Pennsylvania. This is the tenth annual meeting in a series which has come to have large interest and importance for school men of Pennsylvania and neighboring states.

At the morning session of April 12, the topic "Grouping by abilities in elementary schools" was discussed by Dr. Bird T. Baldwin, of the State University of Iowa; Professor LeRoy A. King, of the University of Pennsylvania; Associate Superintendent A. J. Gerson, of Philadelphia, and others. Under the direction of Superintendent Edwin C. Broome, of Philadelphia, the topic, "The state financial program," was considered by Mr. G. C. L. Riemer, of the Pennsylvania Department of Public Instruction; Dr. J. E. Butterworth, professor of rural education in Cornell University; State Superintendent Thomas E. Finegan and Dr. Harlan Updegraff, professor of educational administration in the University of Pennsylvania. The subjects presented at the afternoon session of April 12 were "Rearrangement of school districts," "Grouping by abilities in secondary schools" and "Difficulties in the teaching of arithmetic." The speakers included Professors Butterworth and Baldwin; Professor A. Duncan Yocum, of the University of Pennsylvania, and Professor M. B. Hillegas, of Teachers College, Columbia University. There were also conferences of teachers in the university and secondary schools. Among the speakers were Dean J. H. Minnick, of the School of Education of the University of Pennsylvania; Dean G. A. Walk, of Teachers College of Temple University; Professor Harold O. Rugg, of Lincoln School, New York City; Mr. Fred F. Moran, executive secretary of the Advisory Board on Vocational Training, New York City, and President Frank Aydelotte, of Swarthmore College. Mr. Edward T. Devine gave an address "An educational program for America" on the evening of April 12.

The state program for teacher training was presented at the morning session of April 13, and extension teaching at the afternoon session. Among the speakers were Mr. A. L.

Rowland, of the Pennsylvania Department of Public Instruction, and Dean G. H. Reavis, of the College and of the School of Education, University of Pittsburgh. There were conferences on vocational guidance, health education, geography, Latin and Greek. A musical program was rendered in the evening, with numbers by the instrumental and glee clubs of the University of Pennsylvania and addresses by Dr. Hollis Dann and Dr. J. Francis Cooke.

The program of April 14 is to embrace a demonstration of the teaching of social studies by Mr. Roy W. Hatch, of the Horace Mann School, papers on the social program of the high school and a conference on continuation schools.

The chairman of the general committee in charge of Schoolmen's Week was Professor Harlan Updegraff.

PROGRAM FOR THE ANNUAL MEETING OF THE AMERICAN COUNCIL OF EDUCATION

THE sixth annual meeting of the American Council of Education will be held at Washington, D. C., on May 4 and 5. The program, as announced by Dr. Charles R. Mann, director, includes sessions in the assembly hall of the Cosmos Club at 10 A.M. and 2:30 P.M. on May 4 and at 10 A.M. on May 5.

President Lotus D. Coffman, of the University of Minnesota, will be chairman of the meeting. Reports will be presented by officers and these committees:

"Committee on Finance," President Donald J. Cowling, *Chairman;* "The Commission in Charge of the Educational Finance Inquiry," Professor George D. Strayer, *Chairman;* "The Committee on Franco-American Exchange," Chancellor Samuel P. Capen, *Chairman;* "The Committee on International Educational Relations," Dean Herman V. Ames, *Chairman;* "The Committee on Federal Legislation," President John H. MacCracken, *Chairman;* "The Work of the National Education Association," William B. Owen, *President;* "The Committee of Management of the University Center for Research in Washington," Dr. Leo S. Rowe, *Chairman;* "The Work of the National Research Council," Dr. Vernon Kellogg, *Permanent Secretary;* "The Committee on Education for Citizenship," President M. L. Burton, *Chairman;* "The Federal Council of Citizenship Training," Honorable J. J. Tigert, *Chairman;* "Training for National Defense," Brigadier General John McA. Palmer, U. S. A.; "The Committee on Standards," Chancellor James H. Kirkland, *Chairman;* "Standards of Physical Fitness of the National Amateur Athletic Federation of America," Colonel Henry Breckenridge, *President;* "The National Board of Occupational Terminology," Lieutenant-Colonel R. W. Briggs, U. S. A.; "The Committee on Occupational Specifications for Highway Engineers of the American Association of Engineers," A. B. McDaniel, *Chairman.*

EDUCATIONAL NOTES AND NEWS

AT the University of Iowa on April 27 an assembly will be held to mark the celebration of the fiftieth anniversary of the founding of the first permanent department of education in an American university. Honorary degrees will be conferred. Dr. Walter R. Jessup, president of the university, will give one of the principal addresses. He will be followed by Dr. James Earl Russell, of Teachers College, Columbia University; Professor Ellwood Patterson Cubberley, of Stanford University; Professor Charles Hubbard Judd, of the University of Chicago; Professor Edward Lee Thorndike, of Teachers College, Columbia University, and Professor Stephen Leacock, of McGill University.

DR. DON C. BLISS, superintendent of schools at Montclair, New Jersey, for many years, was elected principal of the State Normal School at Trenton on April 7. As has been stated here, the present head of the Trenton institution, Dr. J. J. Savitz, is to take charge of the new state normal school to be opened at Glassboro in the fall.

B. C. SHACKLEFORD has been appointed assistant superintendent of the St. Louis, Mo., schools to succeed the late W. J. Stevens. At the time of his appointment, Mr. Shackleford was the principal of the Mullanphy school.

MR. H. M. THOMAS, assistant superintendent of the public schools of Harrisburg, Pa., has been elected superintendent to succeed Mr. F. E. Downes, who retired on March 1.

THE new president of the Edinboro, Pa., State Normal School is Mr. C. C. Crawford, who for five years has been a member of the faculty of the school.

DR. CAMERON HARMON, who resigned from the presidency of Missouri Wesleyan College

to accept the pastorate of the Huffman Methodist Episcopal Church in St. Joseph, Missouri, last September, has accepted the presidency of McKendree College. He takes office at once.

MR. FRANCIS R. BACON, for several years assistant to Dean W. P. Laird, of the School of Fine Arts of the University of Pennsylvania, has been elected headmaster of the Cleveland School of Architecture.

THOMAS WEBB WATKINS, assistant headmaster of the Huntington school of Boston, has been appointed to the principalship of Maine Wesleyan Seminary. He succeeds John Orville Newton, who announced his resignation several months ago.

SUPERINTENDENT R. H. SNYDER, of the Idaho Falls public schools, has been elected president of the Idaho State Teachers Association.

DR. WILL GRANT CHAMBERS, dean of the summer session and educational extension of the Pennsylvania State College, was injured in an automobile accident last week. Dean Chambers' condition is improved, but he was unable to give his address, as scheduled, in the Schoolmen's Week program at the University of Pennsylvania on April 13.

MEDALS have been received by Dean William F. Russell, of the college of education at the University of Iowa, recently appointed associate director of the International Institute, Teachers College, New York City, and Mrs. Russell from the Chinese government commemorating a reception by the president of China held in September, 1921, which was attended by Dean and Mrs. Russell. Dean Russell was in China as a member of a government educational commission investigating conditions in China and Russia.

PROFESSOR JAMES H. TUFTS, head of the department of philosophy at the University of Chicago, has been elected to the newly-created office of dean of the faculties at the University of Chicago. The duties of the new officer will involve "cooperation with the president in matters pertaining to the educational administration of the university."

IN protest against the action of the board of incorporators in not re-electing Dr. Alice Weld Tallant as professor of physiology in the Women's Medical College, Philadelphia, four members of the faculty have tendered their resignations. They are: Professor Ruth W. Lathrop, Professor Esther M. Weyl, Professor Laura E. Hunt and Professor Frances C. Van Gasken. Dr. Tallant had been a member of the college faculty for 20 years.

DR. D. S. WELLES, for four years associated with Dr. William R. Hart, who resigned on March 31 as head of the department of education at the Massachusetts Agricultural College, has been appointed his successor. Harry N. Glick, who during the past year has been studying for the degree of Ph.D. in the school of education of the University of Illinois, has been appointed professor of education.

DR. W. CHARLES WALLACE presented his resignation as president of Westminster College, of New Wilmington, Pa., at a meeting of the board of trustees in Pittsburgh on April 3.

PROFESSOR JACOB T. BOWNE, for the past thirty-eight years librarian and teacher of library methods at the Springfield Young Men's Christian Association College, will resign on June 1. He is seventy-six years of age.

DR. FLORENCE GILMAN, college physician at Smith College, has resigned and plans to enter public health work in Boston.

DR. ANSON PHELPS STOKES, former secretary of Yale University, has been elected a trustee of Tuskegee Institute.

MRS. ANNA BROADY HAGGARD, of Cheyenne, Wyoming, has been appointed a trustee of the University of Wyoming.

MR. THOMAS E. DOYLE has been appointed by the judges of the court of common pleas to fill the vacancy on the Board of Education of Pittsburgh caused by the death of Mr. McSwigan.

PROFESSOR DAVIS R. DEWEY, head of the economics department of the Massachusetts Institute of Technology, is leaving for the west the middle of May. He will go to Hawaii, returning to California in time to give courses in the summer school of the University of California.

MISS MARGARET A. KNIGHT, dean of women at Pennsylvania State College, is absent on

leave during this semester and is traveling in Europe. The acting dean of women is Miss Charlotte E. Ray, a graduate of the University of Pittsburgh.

PROFESSOR BLISS PERRY spoke on "Teaching as a vocation" in the third of the Harvard University vocational lectures on March 26.

PROFESSOR GEORGE ELLSWORTH JOHNSON, of the Harvard Graduate School of Education, is giving a series of six lectures this spring on "The child in pre-school years," a course offered in Boston for citizens under the auspices of the division of university extension, Massachusetts department of education.

DR. WILLIAM MCANDREW, associate superintendent of the New York City schools, is to be the speaker at the annual conference of alumni teachers of the College of Liberal Arts of Boston University in Boston on April 14.

AT the annual meeting of the Michigan Schoolmasters' Club, held last week at the University of Michigan, Dr. David Friday, president of the Michigan Agricultural College at East Lansing, gave the principal address, taking as his subject "A national economic survey."

REV. DAVID S. CAIRNS, professor in the United Free Church College, Aberdeen, Scotland, was scheduled to give the Lyman Coleman lectures this week at Lafayette College.

A SERIES of regional conferences of school committee members and superintendents of schools was held on April 6 in various parts of Massachusetts, under the auspices of the Massachusetts State Department of Education. The speakers at the conference in Boston included Commissioner Payson Smith, whose subject was "Fixing responsibility in the administration of schools," and Professor George D. Strayer, of Teachers College, Columbia University, who discussed the question "Are present educational costs excessive?"

THE annual public conference of the Massachusetts Society for Mental Hygiene was held in Boston on April 12. Dr. C. Macfie Campbell, director of the Boston Psychopathic Hospital, presided. The topics and speakers included "Salvaging the backward child" by Dr. Walter E. Fernald; "The nervous child" by Dr. Douglas A. Thom; "The delinquent child" by Hon. Frederick P. Cabot, and "The work of the Massachusetts Society for Mental Hygiene" by Dr. George K. Pratt.

THE twelfth annual meeting of the College Art Association of America, composed chiefly of professors, was held in Boston last week. Sessions were held in the Boston Museum of Fine Arts and in the Fogg Art Museum, at Harvard. The program included discussion of methods of teaching art in colleges.

COLLEGE and university registrars of Pennsylvania, Ohio and West Virginia will hold a sectional meeting at Pittsburgh on May 17 and 18, under the auspices of the American Association of Collegiate Registrars.

THE national convention of Parent-Teacher Associations will be held at Louisville, Kentucky, from April 23 to 26.

THE Pittsburgh Board of Education has authorized a bond issue of $3,000,000 at 4½ per cent. interest. The program for additional school facilities aims to provide for several thousand pupils now attending on part time.

BOULDER, COLORADO, is to have two new junior high schools at a cost of $300,000.

PRELIMINARY plans for a $1,000,000 campaign for Catholic diocesan high schools in Rhode Island were made at a meeting at Providence on April 9 of the Catholic diocese of Providence.

MR. ELBERT H. GARY, of New York, has given $100,000 to the Northwestern University Law School.

WAKE FOREST COLLEGE, North Carolina, will receive the principal of a trust fund valued at almost $2,000,000, established by the late Jabez A. Bostwick, one of the early associates of John D. Rockefeller, John D. Archbold and Henry M. Flagler in the development of the Standard Oil Company, under a decision just handed down by the Appellate Division of New York State.

THE will of Miss Marcia P. Browne, for many years a teacher in Malden, Massachusetts, disposes of an estate estimated at $40,000, which was accumulated from her pay as a teacher and through the writing of text-books. The income of $10,000 is to be used for the education of a "young woman who has bright

prospects and will be a credit to the community," to be selected annually by the faculty at the University of Vermont. The young woman is to study at the University of Vermont unless classes are closed to woman students, in which case she is to enroll at Mount Holyoke.

PLANS for the new medical school of the University of Chicago contemplate a school devoted to the progress of medical science, according to an announcement by Acting President Ernest O. Burton. He says of the school, that "while it will undoubtedly produce practitioners, and these of a very high class, its main task will be the practice and promotion of research, and many if not most of its students will become investigators or teachers in the field of medical science. This field has been chosen because it is believed that as medical education stands to-day, the university's greatest contribution to human welfare can be made through the promotion of medical science and the producing of men trained in the science of medicine."

THERE has been a revision of faculty organization in the Massachusetts Institute of Technology. Instead of a large number of small committees dealing with a great variety of matters, there is now an executive committee known as the faculty council which handles the bulk of routine matters. Only such problems as the council deems necessary are brought before the assembled faculty. The council includes the president, the dean, the secretary of the faculty and the director of the summer session.

THE recent legislature of Washington passed a bill making physical training optional in high schools of the state, and a bill also establishing January 16 as "Temperance and Good Citizenship Day." The latter act provides that school superintendents and teachers must prepare appropriate programs for the day.

BY a vote of 25 to 24 the New York State senate on April 4 defeated the Antin bill, which would have given the State educational commissioner control of instruction and vocational training of inmates in reformatories. This was one of the recommendations made by Governor Smith in his proposed statutory consolidation of the work of state departments and bureaus.

AMONG the laws enacted by the recent legislature of Kansas were two of importance in relation to schools. One was the eight-months minimum term which provides state aid for weak school districts, so that every school, city and rural, will have not less than eight full months of school work every year. This becomes effective with the opening of the new school year in September. The other bill was an amendment to the truancy and child labor laws. It provides that children can not work in any sort of gainful occupation until they are at least fourteen years old, and they must have completed the eighth grade of the schools. The age limit was increased to sixteen years unless the pupil finished the eighth grade of school.

THIRTEEN American college students have been awarded fellowships in French universities by the executive committee of the American field service fellowships for French Universities, Inc., and six American college men now at French institutions also have had their fellowships renewed. The fellowships were established in 1919 as a memorial to members of the field service who were killed or died during the war. The service is now conducting a campaign for 127 scholarships, one for each member who lost his life during the war. Those awarded fellowships for 1923-24 and their colleges follow: John W. Ames, Jr., Harvard University; John S. Cromelin, Princeton University; Lawrence Bass, Yale University; Max J. Waeserman, Cornell and University of Illinois; Boyd R. Alexander, United States Naval Academy and Massachusetts Institute of Technology; Samuel Chamberlain, University of Washington and Massachusetts Institute of Technology; Harold L. Dandoren, Williams College; Matthew F. Desmond, University of California; Richard F. McKoen, Columbia University, University of Paris; Thomas R. Palfrey, Indiana University; William C. Doub-Kerr, Davidson College, University of North Carolina, University of Chicago, Columbia University.

A DEMONSTRATION opposing the changing of Ghent University into a Flemish university recently brought together 100,000 manifestants

of both sexes, according to police estimates cited by the Associated Press. The procession marched through the streets for hours. Occasionally the marchers met with counter-demonstrations by persons who unsuccessfully tried to interfere with them. There were several encounters with the police, and about one hundred persons were arrested. A few policemen were injured.

SEVENTY-FIVE University of Maine senior students in the College of Technology engineering courses have spent a week in Boston and vicinity, visiting industrial and public service plants. The students were accompanied by Dean Harold S. Boardman, Professor C. A. Brautlecht of the chemical department, Professor E. H. Sprague of the civil, Professor W. E. Barrows of the electrical and Professor W. J. Sweetser of the mechanical engineering department.

SPECIAL CORRESPONDENCE

SOME USES OF THE FRESHMAN TEST IN THE SMALLER COLLEGE

IN 1919, 1920, and 1921, the Thurstone Intelligence Test (in the 1919 and 1920 editions) was applied to the entering classes at Sweet Briar College; in the two latter years, to seniors also—making a total of some 450 subjects.

Percentage accuracy and "adjusted" scores, the latter found by subtracting the sum of errors and omissions from the number of problems correct, were found to promise greater usefulness than the usual speed score (number of problems correct). Decile rank in all three scores was accordingly determined for each student, and placed on file in the office, for general consultation by faculty advisers, and as an aid in decisions on doubtful students, petitions for extra hours, the bestowal of scholarships, etc. These records have been found especially useful by the writer in stirring the dormant ambitions of students in the upper test deciles whose academic interests had been hitherto slight, and in advising students from the lower deciles, with naturally slow-moving minds, as to methods of study, hours of work, and interests within the range of their endeavors.

The predictive value of the test, as regards success at Sweet Briar, has been checked up by careful comparison with academic grades over three college years; and by analysis of cases of discrepancy through consultation of health files and the college physician, examination of sub-freshman records, retesting, and rescoring. Although the altered form of the test in the second edition, and the difficulty of standardizing the scoring of one of the problems in the earlier one, has handicapped us, the following conclusions have been fairly well established.

1. Differences in test rating may be assumed to represent largely differences in native endowment rather than in acquired ability or knowledge, since, of the seniors, after three years of presumably more or less intensive training in the development of alertness of mind, adroitness of reasoning, and ease of apprehension of the contents of the printed page, few exceed the records of the brightest freshmen (in such feats, *e. g.*, as the matching of abstract statements, the detection of the truth or falsity of syllogistic reasoning, and the like).

2. The correlation coefficient for academic grades and tests (adjusted scores) rises from .43 to .517 when sophomore and junior as well as freshman grades are included, in spite of the more selected character of the later groups. All four years need to be considered in determining predictive value.

3. Students ranking at entrance in the lowest test decile (representing approximately a range of scores of from 40 to 60 in problems correct, from 40 to 65 in percentage accuracy) have practically no chance of winning the A.B. (or B. S.) degree. Pending the adoption of some more accurate system of admission, the college now admitting upon certificate might profitably eliminate at entrance the lowest decile, with certain precautions even the lowest quartile.

5. As measured by the test in hand, the mental calibre of Sweet Briar students compares favorably with that of the students in the northern colleges reported by Thurstone (average 86.6). Further, from 1919 to 1922 there has been a marked improvement in the mental level of both freshman and senior classes.

4. A certain number of discrepancies between test ratings and academic success are inevitable, owing to the variety of factors conditioning

the latter rather than to the unreliability of the former in gauging mentality. Health especially injects a more or less incalculable element into the situation; accuracy of prediction hinging both upon the general vitality and endurance of the student of brilliant mind, and upon the special health conditions prevailing at the time of the test in the case of the mediocre and low grade. A juster rating would usually be secured by retesting all of the lower decile with an alternative form of the test, and averaging the scores; by adding, possibly, a will test to the mental test for the highest deciles.[1]

6. Refusal of applicants with less than the four conventional Latin credits (2, 1 and 0) would have cost the college in the three years in question a considerable proportion of its brightest and most successful students, as measured either by tests or grades.

7. Test scores tend to vary inversely with the age of the freshman, from 16 to 21, the oldest applicants representing usually the slower minds that have required a longer period to complete their preparation. Grades, on the other hand, tend to vary directly with age, indicating the doubtful value of rushing the precocious but inexperienced mind into college.

8. Whether or not the test is a true measure of ultimate achievement, it undoubtedly measures pretty accurately *studying* ability at date, *i. e.*, rate and ease of assimilation of printed matter. The wide variation in speed and accuracy revealed within the limits of each class afford data which may profitably be utilized by the instructor in sectioning classes, regulating assignments, and advising individual students as to study habits and the like.

9. Success in the different types of problems represented in the test blank (information, analogies, matching of statements, sentence completion, truth or falsity of reasoning, arithmetic) may within certain limits be utilized to predict success in linguistic, scientific or mathematical studies. *E.g.*, a miscellaneous information test, including the names of commercial articles and the like, yields an astonishingly high correlation wtih Latin grades.

ELSIE MURRAY

WELLS COLLEGE,
AURORA, N. Y.

DISCUSSION

A GENERAL INFORMATION TEST

EARLY in the academic year the freshmen in all colleges in the University of Maine were given an examination covering the subjects they had pursued in their fitting schools. The papers presented at this time gave us information upon which to base an opinion regarding their previous work.

At the beginning of the second semester the seniors in the College of Arts and Sciences were given a set of questions of a very different character. These questions were designed to test the students with reference to their general information upon subjects which are currently discussed at the present time. The students were told that if they settled in a small community as teachers they would be likely to be asked just such questions as these by the citizens of the community. The questions follow:

1. The legislature of Kentucky very nearly passed a resolution forbidding the teaching of evolution in the schools. The same question is being discussed in Minnesota and elsewhere. (*a*) Why was the teaching of evolution opposed? (*b*) What is your point of view in the matter? (*c*) State your reasons.

2. Do you think the recent occupation of German territory by the French justified? Your reasons.

3. What was the origin of the Ku Klux Klan? Certain high-minded men belong to the organization: How do they justify it? What is the chief argument against its existence?

4. Who are the Fundamentalists, and for what do they stand?

5. Make a brief statement about the following: Bonar Law, Sarah Bernhardt, Judge Landis, Charles E. Hughes, George Bernard Shaw.

6. What do you understand by (*a*) eugenics; (*b*) the Einstein theory; (*c*) a luxury tax?

The time allotted for this examination, eighteen minutes, was rather brief. The answers indicated that so far as these questions were representative ones the young men and women were unusually well informed upon current topics.

Specifically it may be said that every student insisted that evolution should be taught

and gave a good reason therefor, although in some cases it was suggested that courses in biology did not make a strong personal appeal.

With reference to the occupation of German territory by the French, 62 per cent. were in favor of it, 32 per cent. opposed to it, and 6 per cent. gave arguments on both sides. In each case a fairly satisfactory statement was made regarding the matter.

Practically every student knew the origin of the Ku Klux Klan, but no one was found who was ready to defend the organization.

Very few students had any realizing sense of what was meant by a Fundamentalist, and this speaks volumes for the breadth of religious thought in the state of Maine. Since, however, the Fundamentalists do exist, it should be a part of the general knowledge of educated people to know what they stand for.

With a few exceptions, such as designating Bonar Law as a congressman from one of the western states, and calling Sarah Bernhardt a singer, a novelist and a social reformer, the statements made concerning the five celebrities were quite accurate. One wrote that although Sarah Bernhardt was old and had but one leg she was still a famous actress.

Practically every one was able to tell what a luxury tax meant; nearly every one had a good idea of eugenics, although in certain cases it was rather infelicitously expressed; but few ventured to express any convictions on the Einstein theory.

It is the opinion of the writer that if any advantage comes from tests of this sort, it lies largely along the line of the stimulation of interest. If a college senior should fail seriously in answering a set of easy questions like these, it ought to prompt him to do a great deal more general reading; and, on the other hand, the student who made an unusually good showing might be expected to develop a proper sense of pride which would see to it that he continued to keep himself well informed.

JAMES S. STEVENS
UNIVERSITY OF MAINE

EDUCATIONAL EXHIBITS

THE National Museum, Washington, as its annual report for 1922 shows, should be of interest and service to teachers throughout the country. In particular, teachers should know that the museum is in a position to aid colleges and high schools by gifts of duplicate material properly labeled. Loans are also made to scientists who do not find it possible to come to Washington. Up to the present about a million specimens have been distributed to educational institutions. The public schools of Washington, D. C. have been, of course, particular beneficiaries of the museum, and school classes visit its halls for the purpose of studying exhibits, and members of the staff have also gone into the high school classrooms occasionally. The museum has recently cooperated with the Pennsylvania State Board of Education in developing educational exhibits on the industries of that state, which are to be used in the revised course of geography in the Pennsylvania schools. The museum has also prepared a food exhibit comprising a series of mounts representing the results on body weight and structure of special diets fed to rats. This exhibit has been used in a half dozen states in the "moving" exhibit on "agricultural trains," and other exhibitions.

This educational work of the National Museum is worth stressing, because museums as institutions for recreation and education are just at the beginning of their development in America. Several of the larger city and state museums are, of course, already doing work of this kind. The point to be made is that the museum should become a universal institution as the library has become in the last twenty years. It needs some wise philanthropist to do for the museum what Carnegie did for the library, namely, make nation-wide gifts for building local museums so as to stimulate local contributions and provide for local support. Teachers should avail themselves of the services of museums wherever they do exist, both by taking the children to the museum and by receiving museum exhibits into the classroom.

BENJAMIN R. ANDREWS
TEACHERS COLLEGE,
COLUMBIA UNIVERSITY

EDUCATION IN PERU

I HAVE just received a copy of the issue of SCHOOL AND SOCIETY for February 3, 1923 and have noted in it the article relative to the reorganization of the schools of Peru.

This article bears on the face of it the evidence that it was written some months ago and just about the time that the present minister of instruction assumed his duties. Since then all Americans have been paid up and with the exception of five who remain all have been allowed to go, as their contracts expired, with four months pay and traveling expenses. The government is preparing to make good to all members of the American group any financial losses they may have suffered. Financial conditions have been such that needed improvements have in many cases been postponed, but the government is giving daily proofs of its desire to make reforms as fast as they can be financed. This year's appropriations will show a considerable increase over those of last year, and on the whole there is improvement along most lines under the able administration of Dr. Julio Ego Aguirre, the present minister of instruction and justice.

I believe that in justice to the Peruvian government these facts should be published and I shall be very grateful if you can find space for them.

FRANK L. CRONE
Director General of Instruction.

LIMA, PERU,
MARCH 7, 1923

QUOTATIONS

THE PUBLIC SCHOOL SYSTEM BOOMED

A RESPONSIBLE New York City daily paper recently printed the following startling headline over one of its news articles: "The Public School System Doomed." If the purpose of this fateful utterance was to attract the attention of the general reader to the seventeenth annual report of the Carnegie Foundation for the Advancement of Teaching, the headliner succeeded in more than an ordinary fashion. For the newspapers for several days were full of editorial references to the alleged pessimism of Dr. Henry S. Pritchett, formerly president of the Massachusetts Institute of Technology, and now president of the Carnegie Foundation. The result was that New York City paid more attention to the public school system in a week than it generally does in six months. That is why we think the headline writer should have said, not "doomed," but "boomed"!

The American public school system is the most important institution we have. If it is doomed, then the United States is doomed. As a matter of fact, what Dr. Pritchett says is that under its rising costs and the increasing burden of taxation "in no distant day we shall see, under these conditions, free education endangered." There is as much difference between doom and danger as there is between death and disease. We think what is in the back of Dr. Pritchett's mind is the conviction that the American public are not satisfied with the present results of free public education, and that, while they are willing to spend money in order to produce an intelligent, reasonable, logical and thinking citizenship, they are not willing to increase their burdens of taxation in order to turn out into our trades, professions and legislatures a lot of half-baked inefficients.

There is no doubt that public education in the United States is suffering from a complication of diseases. Some are organic, and some are the inevitable accompaniments of childhood, and we thoroughly believe that American education is still in its infancy. It is also true that we Americans spend less for public education than we spend for chewing-gum and the movies. Dr. Pritchett's mistake, if he has made a mistake, is the misleading one of laying too much emphasis on the money that is being spent for education, and too little emphasis on what we are getting for that expenditure of money.—*The Outlook.*

EDUCATIONAL RESEARCH AND STATISTICS

THE INTERESTS OF TEACHERS IN STUDIES DURING THEIR HIGH-SCHOOL COURSE

I HAVE ratings made by advanced students of education, teachers and school officers of their interests in high school studies when they were in their teens, which seem worthy of report and preservation for future comparison with similar ratings by engineers, lawyers, business men and others.

Most of the ratings are of the relative interest of English literature, English composition, history, algebra, geometry, Latin and science. These studies were put in an order for interest from 1 to 7, 1 being high.

The variety is very great, every subject be-

TABLE I

The variety of rankings of interests. Records of 58 men, advanced students of education, for age 14-18. 1 is high. 9 is low.

Rank	Studies and Activities								
	E. Lit.	E. Comp.	Hist.	Alg.	Geom.	Latin	Science	Drawing	Teaching
1	7	3	6	5	7	1	10	1	18
2	9	3	14	8	5	4	11	..	4
3	11	9	3	4	5	6	6	2	11
4	9	8	10	4	6	11	7	3	1
5	7	10	5	6	4	7	7	5	7
6	4	6	6	9	7	3	7	9	7
7	7	7	5	7	8	7	4	8	5
8	4	9	4	9	11	3	5	9	4
9	..	3	5	6	5	16	1	21	1
Median rank	4	5	4	5-6	5-6	5-6	3-4	7-8	3

TABLE II

Ranks of studies for interest at the age of 14-18.

Group	No. of individuals	E. Lit.	E. Comp	Hist.	Alg.	Geom.	Latin	Science
A men	58	2-3	4	2-3	6	6	6	1
B men	78	2-3	6	2-3	5	4	7	1
C men	32	1	4	2-3	5-6	5-6	7	2-3
D men	22	4	6	4	1-2	4	7	1-2
E women	22	1	7	2	3-4	5-6	3-4	5-6
F women	24	1	4	3	7	5-6	5-6	2
G women	32	1	4	2-3	6-7	5	6-7	2-3
H mixed	47	1-2	6	4	4	4	7	1-2
I mixed	92	1	4-5	2	4-5	6	7	3

Group	No. of individuals	E. Lit.	E. Comp	Hist.	Math.	Latin	Phy. Sci.	Biol. Sci.
J men	28	2	5-6	1	5-6	7	4	3
K men	20	2-3	6	2-3	1	4	5	7
L women	12	1	3-4	2	6	7	5	3-4

ing usually put in almost every position within a group of only fifty or so individuals. Table I, for example, shows the detailed ranks for a group of 58 men, teachers and school officers who were engaged in graduate study at the time.

In spite of the great variety of individual interests, there are general tendencies of preference. These are shown by the median ranks of the subjects, group by group, in Table II.

The subjects which have "real" and modern content are preferred to those which are "formal" or "abstract" or not obviously concerned with modern life. English literature, history and science are beyond question the three most liked, the men favoring history and science among these and the women favoring literature. Latin is at the bottom. English composition, algebra and geometry are about alike. If we may trust their memories, the preferences and aversions of this group of future teachers were thus much like those reported by high school pupils in general. Group K, whose judgment is exceptional in several ways, is a group of principals of private schools, and averages perhaps twenty years older than the other groups.

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